

Appl. No. 09/844,175
Response to 11/16/2006 Office Action

In the Claims

Claims 1-30 [canceled].

31. [Currently Amended] A removable electrical interconnect apparatus ~~for removably engaging electrically conductive pads on semiconductor substrates having integrated circuitry fabricated therein, the apparatus comprising:~~

an apparatus substrate; and

an engagement probe projecting from the apparatus substrate to engage a single conductive pad on a semiconductor substrate ~~having~~ comprising integrated circuitry ~~formed in the semiconductor substrate,~~ the engagement probe comprising semiconductor material and having an outer surface comprising an apex in the form of a knife-edge line configured to removably penetrate ~~[[a]]~~ the single conductive pad of the semiconductor substrate comprising integrated circuitry and to removably penetrate another single conductive pad of another semiconductor substrate also comprising integrated circuitry.

32. [Previously Presented] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on the projection.

33. [Original] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line projects from a penetration stop plane.

34. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line projects from a penetration stop plane, the knife-edge

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line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of conductive pads which the apparatus is adapted to engage.

35. [Previously Presented] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on the projection, the knife-edge line projecting from a penetration stop plane on the projection.

36. [Previously Presented] The removable electrical interconnect apparatus of claim 31 further comprising a projection from the apparatus substrate, and wherein the engagement probe is formed on the projection, the knife-edge line projecting from a penetration stop plane on the projection, the knife-edge line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of conductive pads which the apparatus is adapted to engage.

37. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein outermost portions of the apex comprise a first electrically conductive material, and wherein the conductive pads for which the apparatus is adapted to engage have outermost portions comprising a second electrically conductive material; the first and second electrically conductive materials being different.

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38. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the engagement probe comprises material of a bulk semiconductor substrate.

39. [Original] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line includes an outer conductive layer.

Claims 40-53 [canceled].

54. [Currently Amended] A removable engagement probe comprising semiconductor material and having an outer surface comprising an apex in the form of a knife-edge line sized and positioned configured to penetrate a single conductive pad; wherein the knife-edge line projects from a penetration stop plane; and wherein the knife-edge line is formed on a projection from a substrate.

55. [Canceled].

56. [Previously Presented] The removable engagement probe of claim 54 wherein the outer surface comprises a plurality of apexes having respective tips and bases, and the penetration stop plane is intermediate the bases and substantially parallel to a surface of the substrate.

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57. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line has a tip and has a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the conductive pad which the apparatus is adapted to engage.

58. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects from the penetration stop plane on the projection.

59. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects from the penetration stop plane on the projection, the knife-edge line having a tip and having a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the conductive pad which the apparatus is adapted to engage.

60. [Currently Amended] The removable engagement probe of claim 54 wherein outermost portions of the apex comprise a first electrically conductive material, and wherein the conductive pad ~~for which the probe is adapted to engage~~ has outermost portions comprising a second electrically conductive material; the first and second electrically conductive materials being different.

61. [Previously Presented] The removable engagement probe of claim 54 wherein the probe comprises material of a bulk semiconductor substrate.

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62. [Currently Amended] The removable electrical interconnect apparatus of claim 31 wherein the knife-edge line is ~~sized and positioned~~ configured to extend elevationally above an uppermost surface of the apparatus substrate.

63. [Previously Presented] The removable electrical interconnect apparatus of claim 32 wherein the projection includes a surface substantially parallel to a surface of the apparatus substrate.

64. [Previously Presented] The removable engagement probe of claim 54 wherein the knife-edge line projects elevationally above an uppermost surface of the projection which defines the penetration stop plane.

65. [Previously Presented] The removable engagement probe of claim 54 wherein the projection has a surface substantially parallel to a surface of the substrate and the surface of the projection defines the penetration stop plane.

66. [Canceled].

67. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apparatus substrate comprises semiconductor material.

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68. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apparatus substrate comprises semiconductor material and the engagement probe comprises semiconductor material of the apparatus substrate.

69. [Previously Presented] The removable engagement probe of claim 54 wherein the engagement probe comprises semiconductor material.

70. [Previously Presented] The removable engagement probe of claim 54 wherein the engagement probe comprises semiconductor material formed from a semiconductor substrate.

Claims 71-74 [canceled].

75. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex comprises a solid mass of material devoid of any void space.

76. [Previously Presented] The removable engagement probe of claim 54 wherein the apex comprises a solid mass of material devoid of any void space.

77. [Currently Amended] An electrical system comprising:
a first electrically conductive pad on a first semiconductor substrate comprising integrated circuitry formed using the first semiconductor substrate;

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a second electrically conductive pad on a second semiconductor substrate comprising integrated circuitry formed using the second semiconductor substrate; and

a removable electrical interconnect apparatus ~~configured to removably engage the first and second electrically conductive pads, the apparatus~~ comprising:

an apparatus substrate; and

an engagement probe projecting from the apparatus substrate and comprising an apex in the form of a knife-edge line and wherein the apex comprises semiconductor material and the apex is configured to removably engage the first electrically conductive pad and to removably engage the second electrically conductive pad.

78. [Previously Presented] The electrical system of claim 77 wherein the apex is configured to penetrate the first and the second electrically conductive pads.

79. [Currently Amended] An electrical system comprising:

a single conductive pad;

a removable engagement probe comprising semiconductor material and comprising an apex in the form of a knife-edge line ~~sized and positioned~~ configured to removably engage the single conductive pad; and

wherein the knife-edge line projects from a penetration stop plane.

80. [Previously Presented] The electrical system of claim 79 wherein the apex is configured to penetrate the single conductive pad.

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81. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex in the form of the knife-edge line comprises a polyhedron.

82. [Previously Presented] The removable electrical interconnect apparatus of claim 31 wherein the apex in the form of the knife-edge line comprises a triangular prism.

83. [Previously Presented] The removable engagement probe of claim 54 wherein the apex in the form of the knife-edge line comprises a polyhedron.

84. [Previously Presented] The removable engagement probe of claim 54 wherein the apex in the form of the knife-edge line comprises a triangular prism.

85. [Previously Presented] The electrical system of claim 77 wherein the apex in the form of the knife-edge line comprises a polyhedron.

86. [Previously Presented] The electrical system of claim 77 wherein the apex in the form of the knife-edge line comprises a triangular prism.

87. [Previously Presented] The electrical system of claim 79 wherein the apex in the form of the knife-edge line comprises a polyhedron.

88. [Previously Presented] The electrical system of claim 79 wherein the apex in the form of the knife-edge line comprises a triangular prism.

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89. [Currently Amended] A removable engagement probe comprising semiconductor material and having an outer surface comprising ~~an apex~~ a plurality of apexes and at least one of the apexes is in the form of a knife-edge line ~~sized and positioned~~ configured to penetrate a single conductive pad;

wherein the knife-edge line projects from a penetration stop plane; and

wherein the ~~outer surface comprises a plurality of apexes having~~ have respective tips and bases, and the penetration stop plane is intermediate the bases and ~~substantially parallel to a surface of a substrate.~~

90. [Canceled].

91. [Canceled].

92. [Previously Presented] The electrical system of claim 79 wherein the knife-edge line has a tip and has a base at the penetration stop plane, the tip being a distance from the penetration stop plane of about one-half the thickness of the single conductive pad.

93. [New] The removable electrical interconnect apparatus of claim 31 wherein the outer surface comprises a plurality of apexes configured to simultaneously engage a single one of the conductive pads.

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94. [New] The removable electrical interconnect apparatus of claim 31 wherein the outer surface comprises a plurality of apexes which are electrically coupled with one another.

95. [New] The removable engagement probe of claim 54 wherein the outer surface comprises a plurality of apexes configured to simultaneously penetrate the single conductive pad.

96. [New] The removable engagement probe of claim 54 wherein the outer surface comprises a plurality of apexes which are electrically coupled with one another.

97. [New] The electrical system of claim 77 wherein the engagement probe comprises a plurality of apexes configured to simultaneously engage one of the first electrically conductive pad and the second electrically conductive pad..

98. [New] The electrical system of claim 77 wherein the engagement probe comprises a plurality of apexes which are electrically coupled with one another.

99. [New] The electrical system of claim 79 wherein the engagement probe comprises a plurality of apexes configured to simultaneously engage the single conductive pad.

100. [New] The electrical system of claim 79 wherein the engagement probe comprises a plurality of apexes which are electrically coupled with one another.

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101. [New] The removable engagement probe of claim 89 wherein the apexes are configured to simultaneously penetrate the single conductive pad.

102. [New] The removable engagement probe of claim 89 wherein the apexes are electrically coupled with one another.